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The genus Antrophyum — I. Synopsis of subgenera, and the American species

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The genus *Antrophyum*, as known at present, comprises more than thirty species of wide distribution in the tropics. Of this number, nine are confined to America, ranging from Mexico and Cuba on the north to Bolivia and southeastern Brazil on the south. The Old World species range from eastern Polynesia to Japan and China, south to New Guinea, the Mascarene Islands and Madagascar, and across Africa to the island of Fernando Po on the west coast.

The genus was established in 1824 by Kaulfuss,* who named six species, but recognized three more in a footnote. Three of the nine were American. The first species to be figured was the Old World *A. reticulatum* (Forster) Kaulfuss,† which may be considered as the type of the genus. Only one of the nine, the American *A. lanceolatum*, was known to Linnaeus.

The nine original species had been described under the Linnaean genus, *Hemionitis*, with which, however, they have very little affinity. They are probably more closely related to *Loxogramme* Presl. Blume recognized this when he classified several species properly belonging to the latter genus under *Antrophyum*,‡ and Presl placed one species of *Antrophyum* with *Loxogramme*.§

When the present work was commenced, it was intended to include the entire genus, but the material at hand was not suffi-

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* Enum. Fil. 197. 1824.

† Schkuhr, Crypt. Gewäch. 6. *pl. 6.* 1805.

‡ Flora Jav. Fil. 84–87. *pl. 36, 37.* 1828.

§ Tent. 215. 1836.

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ciently complete for an exhaustive study of all the species, and in this paper only the American species are treated extensively. Complete descriptions of all the species can not be given without comparative study of the types in the European herbaria. Further field work is also necessary.

The herbarium of the New York Botanical Garden has furnished most of the material studied, but loans from the Eaton Herbarium and from the U. S. National Herbarium have been of great assistance, and hearty thanks are hereby tendered Professor Evans and Mr. Maxon for their aid. To Dr. Christ also, thanks are due for a loan of type material of one of his species.

ANTROPHYUM Kaulf. Enum. Fil. 197. 1824

Plants epiphytic or on rock (rarely in soil); rhizomes rather stout, short-creeping or suberect, usually clothed with a dense mass of fuzzy roots, together with the bases of old fronds; apical buds and stipe-bases covered with delicate deciduous clathrate scales whose cell-walls may be smooth or papillose; fronds cespitose, glabrous, membranous, coriaceous, or fleshy, sessile or with alate stipes; costas complete or vestigial, the secondary venation reticulate, without included veinlets, of long costal areolae and shorter, frequently divergent lateral ones, which may be closed along the margin, or open in free veinlets: sporangia in either simple or branching lines mostly along the longitudinal veins, free or more or less interconnected, or completely reticulated and on all the veins (in mature fronds), superficial or immersed in grooves; indusia wanting; paraphyses of various shapes may be mixed with the sporangia.

Various methods have been used to divide the genus into groups. Those based on gross foliar or soral differences alone have not been successful, as they have included in the same sections species which differed in fundamental characters such as spore-form. At the suggestion and aided by the advice of Dr. Underwood, to whom sincere thanks are due, the writer has endeavored to find out whether microscopic characters would furnish adequate means of separation. The results have been extremely satisfactory. Part of the scheme given below is based on that used by Fée in his monograph of the genus,* but it is very much modified and extended, and the characters are chosen so as to show natural relationships. By a combination of the characters of soriation and spore-form, separation into four subgenera is readily made. The use of microscopic characters may be carried still further. The Asiatic species are easily divided into groups and to some extent, into species according to the shape of the soral paraphyses. By this means certain species, otherwise easily confused, may be separated without difficulty.

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* Mém. Foug. 4: 39–52. 1852.

Four of the five African species, which possess several well-marked distinctive characters, have been separated as a new subgenus, **Antrophyopsis.*** The only other African species known, *A. immersum*, seems to belong rather with the type section.

The terms "diplanate" and "triplanate" have been used for the spores instead of the usual "reniform" and "sphaero-tetrahedral" as being of more exact significance, since they relate not to mere variable form but to systems of spore-cleavage.

Synopsis of subgenera

Soriation in mature fronds completely reticulated, superficial or slightly raised; spores diplanate; paraphyses present; costa vestigial, marginal veinlets free to the edge of the frond; stipe-scale cell-walls papillose (all?).
§ **Antrophyopsis** (African)*

Soriation of simple or branched lines which may be more or less interconnected but never completely reticulated, superficial or immersed in grooves; spores diplanate or triplanate, paraphyses present or absent; costa complete or vestigial, marginal veinlets usually anastomosing with the anterior veinlets to form closed areolae; stipe-scale cell-walls smooth.

- Spores diplanate, paraphyses pyriform; costa complete. § SCOLIOSORUS (American)
- Spores triplanate.
  - Sporangia in three or four long grooves on each side of the complete costa and parallel to it; paraphyses wanting. § POLYTAENIUM (American)
  - Sporangia, except in the three narrowest forms, in branched lines, more or less connected; paraphyses present or absent; costa complete or vestigial. § EUANTROPHYUM
    - Paraphyses wanting; costa complete or nearly so. *Costata* (American)
    - Paraphyses present; costa vestigial. *Ecostata* (Old World)

The American section of the genus *Antrophyum* comprises nine species separable into three subgenera as noted in the group synopsis, according to (1) soriation, and (2) spore-form. All are alike in having a complete or nearly complete costa, a character distinguishing them from all the Old World forms, some of which, however, approach this condition. A still more sharply distinctive character, if *A. ensiforme* be excluded, is the absence of paraphyses, which are found in all the Old World species.

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* Type, *A. Boryanum* (Willd.) Spr.

On the basis of this character together with spore-form, *A. ensiforme* Hooker with diplanate spores may be separated from the others which lack paraphyses and have triplanate spores. Moore's genus *Scoliosorus* was based on this species, but on the strength of a non-existing character inferred from Hooker's incomplete description. The characters here given, however, and a slight but decided difference in soriation are sufficient to separate it at least as a subgenus.

Using soriation as a basis, Desvaux in 1827 established a new genus, *Polytaenium*, with *A. lineatum* as type. The sporangia in this species are in three or four long straight deep grooves on each side of the costa, and parallel to it, an arrangement considerably different from the normal American type which consists of series of divergent branching lines, superficial or only slightly immersed. In some of the broadest forms of *A. lineatum*, however, the type of soriation approaches the normal, and on the whole, the similarities seem greater than the differences, which are satisfied by recognition as a subgenus.

The remainder of the species belong to the costate section of *Euantrophyum*. After we eliminate *A. lanceolatum*, which is easily distinguishable, six species remain, two of which are described here for the first time, and one other which has never been accepted. These three are based on material originally identified as *A. subsessile* Kunze (*A. brasilianum* (Desv.) C. Chr.), but such reference is not justified. The six species form a group of coördinate forms, no one of which is entitled to stand as representative of the others. If *A. discoideum*, for example, be refused recognition, then logically *A. cayennense* which has always been recognized must also be referred to *A. brasilianum*. The fact that in the most superficial and easily determined character, outline, *A. discoideum* resembles *A. brasilianum* more closely, is not a sufficient reason for denying its validity. In reality it is less closely related to the latter fern than is *A. cayennense*, which shows its affinity in a coriaceous texture and closed marginal areolae, and sometimes even in outline.

Reasons of value equal to those just given for recognizing *A. discoideum* can be given for the admission of the other species treated here. Indeed, further field work may show that two or three other variant forms to which reference is made under the species concerned, are also entitled to specific rank.

The American species may be separated as follows:

- Spores diplanate; paraphyses pyriform (*Scoliosorus*). 1. *A. ensiforme.*
- Spores triplanate; paraphyses wanting.
  - Sporangia in long simple grooves parallel to costa (*Polytaenium*). 2. *A. lineatum.*
  - Sporangia not in long simple grooves (*Euantrophyum*).
    - Areolar axes longitudinal. 3. *A. lanceolatum.*
    - Areolar axes divergent.
      - Soral lines slightly sunken; marginal venation mostly closed in short areolae with few free veinlets.
        - Fronds coriaceous, margins reflexed.
          - Fronds oblanceolate, rather thick, opaque. 4. *A. brasilianum.*
          - Fronds elliptic, thin, translucent. 5. *A. cayennense.*
        - Fronds not coriaceous, margins flat; fronds oblong, long-acute. 6. *A. Dussianum.*
      - Soral lines superficial; marginal venation of open free veinlets.
        - Fronds broadly oblanceolate, short-stiped, thick. 7. *A. Jenmani.*
        - Fronds elliptic-lanceolate, sessile. 8. *A. anetioides.*
        - Fronds oblong or oblanceolate, subsessile, thin. 9. *A. discoideum.*

1. ANTROPHYUM ENSIFORME Hook.; Benth. Pl. Hartweg. 73. 1841. (Type from Mt. Totontepeque, Mexico.)

Antrophyum falcatum Mart. & Gal. Mém. Foug. Mex. 49. *pl. 12.* 1842.

Antrophyum carnosum Liebm. Vid. Selsk. Skr. V. **1**: 161. 1849.

Antrophyum Galeottii Fée, Mém. Foug. **4**: 51. *pl. 5. f. 4.* 1852.

Scoliosorus ensiformis Moore, Ind. Fil. xxix. 1857.

Dictyogramme ensiformis Trev. Atti Ist. Ven. V. **3**: 592. 1877.

Spores diplanate, paraphyses pyriform, brown or yellow, on slender pedicels of various lengths which may arise singly or in clusters from a thickened basal cell; sporangia in simple or usually only once-forked, oblique, free, superficial lines along each side of the frond; fronds narrowly oblong, often curved, tapering very gradually below to a sessile base, less gradually above to a narrowly acute apex, thin, rather flaccid, 17 × 1.1–50 × 2.7 cm. margins reflexed, slightly repand; areolae in branching rows divergent from the complete costa, open along the margin; costa and areolation superficially indistinct.

Mexico to Costa Rica.

Antrophyum ensiforme occupies a rather anomalous position in the genus. Moore in 1857 made it the basis of a new genus, *Scoliosorus*, giving the following reasons based on Hooker's description and figure. "This plant having neither netted veins nor netted sori, cannot possibly belong to *Antrophyum*." His misapprehension regarding the venation was due to the fact that in the original description no evidence of a secondary venation was shown.

But a distinct difference in soriation really exists. In *Euantrophyum*, the soriation consists of series of lines which usually branch several times, and may anastomose considerably. In immature fronds or in the narrowest specimens, the lines may be simple, but the relationship is obvious. In *Scoliosorus*, the soral lines are simple or usually only once-forked, and at a glance appear different from the normal type, although probably derived from it.

Another distinctive character is found in the paraphyses which are present in no other American species. These, however, do not differ essentially from one type found on some of the Old World species and may be indicative of a paraphysate ancestry for all the present species.

The character of greatest differential value known at present is found in the diplanate spores which entitle the species at least to rank as a subgenus. Judging from external characters, anatomical differences exist as well which would further distinguish it from the typical species.

2. ANTROPHYUM LINEATUM (Sw.) Kaulf. Enum. Fil. 199. 1824.
Hemionitis lineata Sw. Prodr. 129. 1788. (Type from Jamaica.)
Vittaria lanceolata Sw. Gesell. Naturf. Freund. Neue Schr. **2**: 133. *pl. 7. f. 2.* 1799.
Polytaenium laceolatum Desv. Prodr. 174. 1827.
Loxogramme lineata Presl, Tent. 215. 1836.
Polytaenium lineatum J. Sm. Jour. Bot. Hook. **4**: 68. 1841.

Spores triplanate; paraphyses wanting; sporangia in three or four long grooves on each side of and parallel to the costa, rarely interconnected: fronds linear-lanceolate, 43 × 1 cm. and 43 × 1.5 cm. (maximum), long-tapering, sessile, membranous; areolae long and narrow, axes longitudinal, cross-veinlets transvese; venation indistinct.

West Indies and Mexico, south to Bolivia. Altitude: 500–1000 meters.

This is the most widely distributed of all the American species of *Antrophyum*. It is easily distinguished from *A. lanceolatum*, with which it is often associated, by its long straight soral grooves. In the broadest fronds, besides the longitudinal grooves, a series of short divergent ones may occur along each margin. One frond was seen which was intermediate between *A. lanceolatum* and *A. lineatum* in soriation and general appearance.

It is frequently referred to as a close relative of *Vittaria*, but it is really no more closely related than other species of *Antrophyum*. The only point of similarity is found in the deep soral grooves, which are, however, of little importance in determining the relationship as compared with the venation. In *Vittaria* this consists of a costa and two submarginal veins formed by the interlocking of pinnate branches from the axial vein. In *Antrophyum*, the venation consists of a primary costa, and a secondary system of reticulated veins of uniform size. In the narrow species of *Vittaria*, the pinnate veins are almost indistinguishable, and the venation apparently consists of three primary veins. *Antrophyum lineatum* seems to be in the process of developing a system of several longitudinal veins connected by secondary cross-veinlets, apparently in a manner similar to that in which the narrow species of *Vittaria* have evolved from the broader forms, but related to *Vittaria* only through some ancestral form of both. The process seems to take place by the gradual suppression of the transverse veins, first by a loss of fertility followed by a diminution in size. *A. lanceolatum* represents an earlier stage of the same process. In it the soral lines are mainly on the longitudinal veins, but not to such an extent as in the related species. If they were immersed the resemblance would appear much stronger.

3. ANTROPHYUM LANCEOLATUM (L.) Kaulf. Enum. Fil. 198. 1824.
Hemionitis lanceolata L. Sp. Pl. 1077. 1753. (Type from Jamaica.)
Dictyogramme lanceolata Trev. Atti Ist.Ven. V. **3**: 592. 1877.
Antrophyum Féei Schaffner; Fée, Mém. Foug. **7**: 42. *pl. 22. f. 1.* 1857. (Type from Mexico.)

Spores triplanate; paraphyses wanting; sporangia in crooked superficial mostly longitudinal lines; fronds linear-lanceolate, 23 × 1–55 × 1.7 cm., usually broadest a little above the middle, sessile, membranous; costas percurrent; margins repand; areolae in rows parallel to the costa, usually pointed.

West Indies and Mexico to northern South America.

This species is one of the commonest and also most easily distinguishable of the genus. Only one other, *A. lineatum*, resembles it closely, and differences in soriation as well as less-marked differences in outline and in the texture of the living plant serve at once to distinguish the two.

In Mexico and Honduras true *A. lanceolatum* is replaced by the form *A. Féei*, which may prove distinct. It has fronds elliptic-lanceolate, 9 × 0.9–19 × 1.4 cm.; smaller and relatively much broader than the type form. Its best claim to recognition lies in the uniform way in which these characters are maintained, combined with its localization in Mexico and Honduras to the exclusion of the related form, which is, however, found not far away in Costa Rica. But if it is a good species, Dominica must be included in its range, since material in the herbarium of the N. Y. Botanical Garden from this island cannot be separated from that collected in Mexico.

4. ANTROPHYUM BRASILIANUM (Desv.) C. Chr. Ind. Fil. 59. 1905.

Hemionitis brasilianum Desv. Prod. 216. 1827. (Type from Brazil.)

Antrophyum subsessile Kunze, Anal. Pter. 29. *pl. 19. f. 1.* 1837. (Type from Peru.)

Antrophyum spathulatum Fée, Mém. Foug. **4**: 46. *pl. 4. f. 6.* 1852. (Type from Colombia.)

Spores triplanate; paraphyses wanting; sporangia in simple or branching lines, divergent from near the costa toward the margin: fronds oblanceolate or oblong, 19 × 1.7–30 × 3.5 cm., narrowed very gradually below, subsessile or with margined stipe of indeterminate length, short-acuminate, young fronds acute; epidermis glossy, wrinkled; margins thin and sharp, reflexed; areolae divergent from the costa, rather distinct on the back of frond; marginal areolae closed, small, costa percurrent, prominent below.

BOLIVIA: Isapuri, *Williams 1354;* Tumupasa, *Williams 1353;* San José, *Williams 1352.* BRAZIL: Ilheos, *Martius* (Herb.

Fl. Bras. *369.*) VENEZUELA: Tovar, *Fendler 305* (in part). COSTA RICA: Turrialba, *Maxon 180, 152; Wercklé.* GUATEMALA: Alta Verapaz, *Von Tuerckheim 8059.*

Owing to the uncertainty regarding Desvaux's type, the positive application of this name is at present impossible, but there seems to be little doubt but that it should replace *A. subsessile* Kunze. The two descriptions agree closely and Kunze himself admitted that they might refer to the same plant.*

A. spathulatum Fée is apparently nothing but an abnormally obtuse form which is not very unusual.

5. ANTROPHYUM CAYENNENSE (Desv.) Sprengel, Syst. **4**: 67. 1827.

Hemionitis cajennensis Desvaux, Berl. Mag. **5**: 311. 1811. (Type from French Guiana.)

Spores triplanate; paraphyses wanting; sporangia in branching, divergent, slightly sunken lines: frond elliptic, acute or acuminate, thin coriaceous, translucent; costa percurrent; margin reflexed; stipes 2–8 cm. long, blades 13 x 2.3–23 x 5 cm.; areolae divergent from the costa, marginal areolae closed, small.

BRITISH GUIANA: 1897, *Jenman.* TRINIDAD: Herb. Bot. Gard. Trin. *346, 1263; Fendler 151.*

The identity of *A. cayennense* is rather doubtful. Desvaux in 1811 described *Hemionitis cajennensis* from French Guiana, but his material was lost sight of and his description would fit either of two species now known from that locality. Kunze, however, arbitrarily applied this name to the form here described. The nomenclature can be definitely settled only by examination of Desvaux's original material.

The species which superficially resembles it most is *A. Jenmani*, from which, however, it differs largely in texture and marginal venation. The herbarium specimens examined had nearly all bleached out to a light color. Those of *A. Jenmani* are all dark-brown. *A. cayennense* has a further distinctive character in its stipe-scales which have much longer setae than any other of the American species.

6. **Antrophyum Dussianum** sp. nov.

Spores triplanate; paraphyses wanting; sporangia in simple or branching slightly sunken lines, divergent from near the costa toward the margin: fronds usually narrowly oblong, 20 × 2–40 × 3.4 cm., tapered gradually both ways, broader a little above the middle, long-acute (young fronds acute), subsessile, membranous, thin, dark-brown when dried; margin flat or slightly reflexed; areolation rather indistinct; areolae divergent from the costa; marginal venation of small closed areolae and some free veinlets; costa superficially distinct to the apex but not prominent.

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* Anal. Pter. 30.

Guadeloupe, *Père Duss 4226* (type). Also Martinique, *Duss 1549;* Dominica, *Lloyd 918;* Trinidad, *Fendler 151 B* (in Eaton herb.); Haïti, *Nash 1358;* Cuba, *Eggers 5269, Wright 775.*

Under this species is included all the West Indian *A. subsessile* so-called except that from Jamaica, which is placed with *A. discoideum.* It resembles *A. lanceolatum,* and seems to form a connection between this plant and the broader species of the genus. It is further distinguished from *A. brasilianum* by its less coriaceous texture and thinner frond, by the presence of rather numerous free veinlets along the margin, and by its less spatulate outline. From *A. discoideum* it is distinguishable by its sunken soral lines; its free veinlets are not punctate at the tips and do not occur regularly as in the latter form.

Two variant forms are included. That from Cuba, *Eggers 5269, Wright 775,* is narrower than the type material, 26 × 2.1–40 × 2.5 cm., and more coriaceous. That from Haïti, *Nash 1358,* is broader and more oblanceolate and acuminate, 25 × 3.5 cm. All three forms are alike in having the stipe-scales very long-attenuate, much more so than in any other American species.

7. **Antrophyum Jenmani** sp. nov.

Sporangia and spores not seen; soral lines apparently as in *A. brasilianum* and the other American species of *Euantrophyum:* fronds broadly elliptic to broadly oblanceolate, 19.5 × 4.5–28 × 7 cm., slightly acuminate, thick, flaccid, friable when dry, opaque; margins slightly reflexed; stipes thick, 2–5 cm. long; costa disappearing near the apex; areolation rather indistinct; areolae narrow, sometimes broad in young fronds, in branching rows which reach at the margin a wide angle of divergence from the costa; marginal areolae open.

BRITISH GUIANA: Potaro River, *Jenman* (type; det. *A. subsessile*); Demerara, Mt. Ragwa, *Jenman* (det. as above). GUIANA: *Leprieur 109* (U. S. Nat. Herb.).

Jenman refers to this plant as large *A. subsessile*,[*] but it is really one of the most distinct in the group, and it is hard to see how he could confuse it with the small thin form which occurs in Jamaica. It is the largest American species in the genus and is easily recognizable by its open marginal areolae, and its flaccid texture.

8. ANTROPHYUM ANETIOIDES Christ, Bull. Herb. Boiss. II. **5**: 12. 1905. (Type from Costa Rica.)

Spores triplanate; paraphyses wanting; sporangia in simple or branching, more or less connected, superficial lines divergent from the axis; fronds elliptic-lanceolate, 15 × 2.5–18 × 3.5 cm., acute (often blunted), rather thin, flaccid, friable when dry, opaque, sessile; margins very slightly reflexed; costa usually disappearing before the upper third, and scarcely visible even by transmitted light near the apex; areolation rather distinct; areolae divergent at a narrow angle from the axis; marginal areolae open.

COSTA RICA: Las Vueltas, *A. Tonduz 12757*.

Thanks to Dr. Christ's kindness in loaning me authentic material of this species, I have had opportunity to examine it at first hand and to compare it point by point with the related species. It differs from *A. brasilianum*, as he says, in texture and outline. In two other characters it is also easily distinguishable from this species, in its open marginal areolae, and indistinct costa. In its costal characters it is particularly interesting as suggesting a transition between the New and Old World species of this genus. In the species of the latter region, a costa is present usually only in the stipe or lower part of the frond. In the lamina, as a whole, or at least in the upper part, it becomes indistinguishable or can be traced only as a vein no larger than any other in the general network of the leaf. This is practically what happens in *A. anetioides*. The costa is nowhere prominent, and a little above the middle of the frond it can be distinguished only by transmitted light, while towards the apex it becomes no larger than the lateral veins.

9. ANTROPHYUM DISCOIDEUM Kunze, Bot. Zeit. **6**: 702. 1848. (Type from Colombia, *Karsten*.)

Spores triplanate; paraphyses wanting; sporangia in simple wavy or branching superficial lines, sometimes considerably connected, divergent from near the costa toward the margin; fronds elongate-oblong, 26 × 4 cm., 35 × 4 cm., 39 × 3.4 cm., narrowed very gradually below to a subsessile base, less gradually above to an acute apex (young fronds rounded or obtuse), membranous, firm; epidermis smooth and dull; margins flat, thin, slightly repand; areolation rather distinct; areolae divergent from the costa; marginal areolae open, ends of free veinlets enlarged and usually darkened; costa disappearing toward the apex, and visible only by transmitted light.

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[*] Bull. Dept. Bot. Jam. II. 4: 211. 1897.

Colombia and Venezuela to Bolivia; Jamaica (?). Alt. 1800–2300 meters.

BOLIVIA: Santa Barbara, *Williams 1355*. VENEZUELA: Manoa, Lower Orinoco, *Rusby & Squires 371*; without definite locality, *Fendler 305*, in part (Eaton Herbarium).

Kunze's description is as follows: *A. fronde lineari-lanceolata, ensiformi-curvata, acuminata, bas longe attenuata in stipitem decurrente, tenuiter marginata, costata; venis obscuris, areolis erectis; soris immersis, flexuosis, interruptis, nec basin, nec apicem, nec marginem attingentibus.*

It will be seen that the two descriptions differ in two characters, outline and soriation. Kunze has "*lineari-lanceolata*" as compared with my "elongate-oblong," and "*soris immersis*" instead of "superficial." The difficulty regarding the first point is removed by a further reference to the form in his discussion of the species. He speaks of it as less spatulate than *A. brasilianum.* This would make it correspond to the description given here. In the other case, it is probable that the facts were misinterpreted. Soral lines which are not at all immersed, may appear so because of a blackening of the line of attachment. But, whatever the name eventually adopted for this species, it is distinct from *A. brasilianum*, with which it has always been confused.

The best distinctive character is found in the marginal venation, which in this species consists of free veinlets, the ends of which are thickened and usually blackened or brown. In good material these ends appear as a line of dots around the leaf about one and a half millimeters inside the thin margin. The dull smooth surface and the very thin tissue also serve to differentiate it from *A. brasilianum*, which has a wrinkled and rather glossy surface, and a thicker leaf.

The material of *A. subsessile* so-called from Jamaica seems to belong here, but its form is not typical. It is much shorter and usually more oblanceolate and less acute, but it shows to a marked degree the line of dots along the ends of the veinlets. The range in size is shown by the following specimens:

Underwood 1370. 21.5 x 2.5 cm.

Jenman, coll. in 1876. 18 x 3 cm.

Species inquirenda

ANTROPHYUM DESVAUXII Moore, Ind. Fil. 80. 1858.

Hemionitis gigantea Desv. Prodr. 216. 1827. (Type from St. Thomas, West Indies.)

Frondibus ecostatis, late lanceolatis, acutis, basi in stipitem late compressum dilatatis; lineolis dense reticulatis superficialibus. Habitat in insula Sancti-Thomae Antillarum. 2 *ped. et ultra;* 4 *poll. lata.* (Desvaux.)

The description agrees with that of Bory's *Antrophyum giganteum*, from the Mascarene Islands. The characters and dimensions given fit that species exactly. The following quotation from De Candolle's "Phytographie" may throw some light on the confusion. Speaking of Desvaux's herbarium, the writer says (page 408), "*Les omissions ou indications fausses de pays et la similitude de certains échantillons avec ceux du Muséum rendent cet herbier fort curieux.*" As the species under consideration could not possibly have come from the locality cited, the conclusions are obvious. The only possible explanation creditable to Desvaux, is that his material came from the African island, St. Thomas, which lies off the west coast, but this presupposes an improbable distribution for the fern, to say the least, and the accidental confusing of the two continents is not very likely.

Species excludenda

ANTROPHYUM MINIMUM Baker, Ann. Bot. **5**: 488. 1891. (Type from Costa Rica.) = **Hecistopteris minima** (Baker).

Soon after I began to study this species, I came to the conclusion that it belonged with *Vittaria* because of (1) the diplanate spores and the peculiarly shaped paraphyses, which are identical in form and size with those of *Vittaria costata* Kunze, (2) the venation, which is that of a very young leaf of *Vittaria lineata* as figured in a paper on the life-history of that species by E. G. Britton and A. Taylor.[*] But further study showed me that it was certainly congeneric with *Hecistopteris pumila* (Spr.) J. Smith, which possesses similar paraphyses and spores, and, as shown by Goebel,[†] has a vittarioid prothallium. The only distinction, except in form, is found in the venation, free-forking in *H. pumila*, and pinnate-anastomosing in *H. minima*. Dr. Christ has described another species, *H. Werckleana*[‡] (*Antrophyum Werckleanum*[§]), which seems to be intermediate in form between the other two, and may show a transitional type of venation. In the material of *H. minima* examined (*Endres*), one frond was found showing a forked tip. The sori are not sunken as stated by Baker in his description, but entirely superficial and in other respects like those of *H. pumila*. Taken together, the three species form a very natural genus with affinities close to *Vittaria*.

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[*] Mem. Torrey Club **8**: 158–211. *pl. 23–31.* 1902.

[†] Flora **82**: 67. 1896.

[‡] Bull. Bois. II. **7**: 265. 1907.

[§] Bull. Bois. II. **5**: 11. 1905.